What is claimed is:

1. A method for compressing and decompressing digital terrain elevation data, images, or graphs in at least two dimensions, including the steps of:

computing a numerical approximation to at least one of the slope, curvature, and/or another predetermined geometric feature, and storing the numerical approximation together with data values prescribed at certain predetermined locations:

applying a suitable compression technique to the geometric feature; and

retrieving the image.

2. The method of claim 1, wherein the retrieving step is carried out by numerically solving for the viscosity solution of the Eikonal Equation, using a source term derived from the compressed slope.

3. The method of claim 1, wherein the retrieving step is carried out by numerically solving for the viscosity solution of the Eikonal Equation, using a source term derived from the compressed slope of the slope, repeated N times, with N taken from the degree of the differential operator associated with the geometric feature.

4. The method of claim 1, wherein the retrieving step is carried out by numerically solving for the viscosity solution of the Eikonal equation, first using a source term derived from the compressed slope, then using a source term derived from the error in the compressed slope, and then adding the resulting solutions.

5. The method of claim 1, wherein the retrieving step is carried out by numerically solving an elliptic differential equation using a source term derived from a compressed

version of the elliptic operator applied to the image, where appropriate boundary conditions are stored and used.

6. A system for compressing and decompressing surface data, including:

a gradient module configured to receive the surface data and generate a gradient signal;

a compression module configured to receive the gradient signal and generate a compressed signal; and

a reconstruction module configured to decompress the compressed signal to recover the gradient signal as a reconstructed signal.

7. The system of claim 6, further including a module configured to store the compressed signal.

8. The system of claim 6, further including a module configured to transmit the compressed signal.

9. The system of claim 6, configured to operate in cooperation with a processor-based computer system.

10. The system of claim 6, wherein the surface data comprises digital terrain elevation data.

11. The system of claim 6, further including an input/output channel in communication with avionics equipment, and configured to provide elevation data to the avionics equipment generated from the reconstructed signal.

12. The system of claim 6, further including an integration module configured to generate reconstructed surface data from the reconstructed signal.

13. A system for compressing and decompressing surface data, including:

a first gradient module configured to receive the surface data and generate a first gradient signal;

a second gradient module configured to receive the surface data and generate a second gradient signal;

a compression module configured to receive the second gradient signal and generate a compressed signal; and

a reconstruction module configured to decompress the compressed signal to recover the second gradient signal as a reconstructed signal.

14. The system of claim 13, further including an integration module to generate reconstructed surface data from the reconstructed signal.

15. The system of claim 13, further including a module configured to store the compressed signal.

16. The system of claim 13, further including a module configured to transmit the compressed signal.

17. The system of claim 13, configured to operate in cooperation with a processor-based computer system.

18. The system of claim 13, wherein the surface data comprises digital terrain elevation data.

19. The system of claim 13, further including an input/output channel in communication with avionics equipment, and configured to provide elevation data to the avionics equipment generated from the reconstructed signal.

20. A method for compressing and reconstructing a signal of at least one dimension, including the steps of:

generating a gradient of the signal;

compressing the gradient of the signal to generate a compressed signal; and

decompressing the compressed signal to generate a reconstructed signal.

21. The method of claim 20, further including the step of generating an integrated signal from the reconstructed signal.

22. The method of claim 21, wherein at least one of the steps of generating the gradient of the signal and generating the integrated signal is carried out by a numerical process.

23. The method of claim 22, wherein at least one of the gradient and the integrated signal is generated to within a predetermined level of accuracy.

24. The method of claim 21, wherein at least one of the steps of generating the gradient of the signal and generating the integrated signal is carried out by analytically.

25. The method of claim 24, wherein at least one of the gradient and the integrated signal is generated to within a predetermined level of accuracy.

26. The method of claim 20, wherein the signal relates to terrain data.

27. The method of claim 26, further including the step of transmitting the reconstructed signal as input to avionics equipment for providing relative elevation data.

28. A method for compressing and reconstructing a signal of at least one dimension, including the steps of:

generating a first gradient of the signal;

generating a second gradient from the first gradient;

compressing the second gradient to generate a compressed signal; and

decompressing the compressed signal to generate a reconstructed second gradient signal.

29. The method of claim 28, further including the step of generating an integrated signal from the reconstructed second gradient signal.

30. The method of claim 29x, further including the step of transmitting the integrated signal as input to avionics equipment for providing relative elevation data.